

WHAT IS CLAIMED IS:

1. A communication system, the system comprising:
a modem session endpoint configured as a conduit for active modem communications involving a user and configured to determine diagnostic information related to the active
5 modem communications, wherein the active modem communications include information directed to an online service;

a tunneling protocol including a diagnostic information message format; and
a gateway configured to communicate the diagnostic information with the modem session endpoint and to communicate the diagnostic information to the online service using
10 the diagnostic information message format of the tunneling protocol.

2. The system of claim 1 wherein the gateway comprises an access concentrator.

3. The system of claim 1 wherein the gateway further comprises an access
15 multiplexer.

4. The system of claim 1 wherein the tunneling protocol comprises a layer 2 tunnel protocol.

20 5. The system of claim 1 wherein the tunneling protocol comprises a point-to-point tunneling protocol.

6. The system of claim 1 further comprising a maintenance mechanism configured to use the diagnostic information automatically to detect and diagnose a communication fault.
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7. The system of claim 6 wherein the maintenance mechanism is configured further to detect and to diagnose the communication fault based on additional diagnostic information related to active modem communications of other users.

30 8. A communication system, the system comprising:

a communication service configured to use one or more tunneling protocol to receive diagnostic information related to active modem communications of each of a plurality of users; and

5 a diagnostic service configured to aggregate the diagnostic information and to detect and to diagnose a network fault automatically based on the aggregated diagnostic information.

9. The system of claim 8 further comprising a maintenance service configured automatically to correct the network fault.

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10. The system of claim 8 further comprising a maintenance service configured automatically to circumvent the network fault.

11. The system of claim 8 further comprising a maintenance service configured
15 automatically to correct and to circumvent the network fault.

12. A computer program stored on a computer readable medium or a propagated signal, the computer program comprising:

20 a modem code segment that causes a modem to communicate an active modem communication, wherein the active modem communication includes information directed to an online service;

a tunnel code segment that causes a computer of the online service to communicate using a tunneling protocol; and

25 a gateway code segment that causes a gateway computer to:
communicate with the modem;
determine diagnostic information related to the active modem communication;
and
communicate with the computer of the online service to provide the diagnostic information to the computer of the online service.

13. The computer program of claim 12 wherein the tunnel code segment further comprises an L2TP code segment that causes the computer of the online service to communicate using a layer 2 tunnel protocol.

5 14. The computer program of claim 12 wherein the tunnel code segment further comprises a PPTP code segment that causes the computer of the online service to communicate using a point-to-point tunneling protocol.

10 15. The computer program of claim 12 wherein the tunnel code segment further comprises an L2F code segment that causes the computer of the online service to communicate using layer 2 forwarding.

15 16. The computer program of claim 12 further comprising a maintenance code segment that causes the computer of the online service to use the diagnostic information to detect and to diagnose a network fault.

20 17. The computer program of claim 16 wherein the maintenance code segment further causes the computer of the online service to detect and to diagnose the network fault based on additional diagnostic information related to active modem communications of other users.

 18. A computer program stored on a computer readable medium or a propagated signal, the computer program comprising:

25 a communication code segment that causes a computer to use one or more tunneling protocol to receive diagnostic information related to active modem communications of each of a plurality of users; and

 a diagnostic code segment that causes the computer to aggregate the diagnostic information and to detect and to diagnose a network fault automatically based on the aggregated diagnostic information.

19. The computer program of claim 18 further comprising a maintenance code segment that causes the computer automatically to correct and/or to circumvent the network fault.

5 20. A method of communicating modem session diagnostic information, the method comprising:

 configuring the online service to communicate with a plurality of modems using a plurality of access sessions, each access session comprising a first communication session and a second communication session, wherein the first communication session logically is
10 nearer the online service than the second communication session;

 configuring the online service to use the first communication sessions to communicate diagnostic information related to the second communication session; and

 configuring the online service to use the diagnostic information to diagnose a communication fault without human intervention.

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 21. The method of claim 20 further comprising configuring the online service to remedy or to circumvent the communication fault without human intervention.

20 22. A method of communicating diagnostic information to an online service, the method comprising:

 configuring the online service to communicate with a user computer using an access session that comprises a first communication session and a second communication session, wherein the first communication session logically is nearer the online service than the second communication session;

25 determining diagnostic information related to the second communication session; and
 configuring the online service to use the first communication session to communicate diagnostic information determined relative to the second communication session.

 23. The method of claim 22 wherein:
30 the first communication session logically connects a gateway service and an online service; and

the second communication session logically connects the gateway service and a networked device.

24. The method of claim 23 wherein the first communication session comprises a
5 network session and the second communication session comprises an active modem session.

25. The method of claim 22 wherein the first communication session further
comprises a tunneling protocol with a diagnostic message, and wherein the first
communication session is configured to use the diagnostic information message of the
10 tunneling protocol to communicate the diagnostic information.

26. The method of claim 25 wherein the second communication session includes an
active modem session.

15 27. The method of claim 22 further comprising configuring the online service to use a
computer to diagnose a communication fault based on the diagnostic information without
human intervention.